15 ~~8~~. (amended) An apparatus for compressing a digital input signal, the apparatus comprising:

index generating means for generating an index in response to the digital input signal;

block length decision means for determining a division of the digital input signal into blocks in response to the index;

block floating processing means for applying block floating processing to the blocks of the digital input signal in response to the index <u>to provide block floating processed blocks of the digital input signal</u>;

orthogonal transform means for orthogonally transforming each <u>of the</u> block floating processed block<u>s</u> of the digital input signal to produce plural spectral coefficients; and

D1 CONT

adaptive bit allocation means for dividing the plural spectral coefficients from the orthogonal transform means into bands, and for adaptively allocating a number of quantizing bits to quantize the spectral coefficients in each of the bands.

16 ~~9~~. The apparatus of claim 15 ~~8~~, wherein:

the digital input signal comprises plural words, each of the plural words having an absolute value; and

the index generating means generates the index by calculating a logical sum of the absolute values of the words.

17 ~~10~~. The apparatus of claims 15 ~~8~~ or 16 ~~9~~, wherein the orthogonal transform means includes a Discrete Cosine Transform circuit.

18 ~~11~~. (amended) The apparatus of claim 15 ~~8~~, wherein:

(a) the index generating means generates an index for each of plural sub blocks obtained by dividing the digital input signal[in time];

(b) the block length decision means includes comparing means for comparing the indices of consecutive ones of the [adjacent] sub blocks of the digital input signal to determine a number of the consecutive ones of the sub blocks of the digital input signal to constitute each one of the blocks; and

(c) the block floating processing means applies block floating processing to [each] the blocks of the digital input signal determined by the block length decision means using, for each one of the blocks, a block floating coefficient calculated from the indices of the sub blocks constituting the one of the blocks.

D1 cont

19 ~~12~~. (amended) The apparatus of claim 18 ~~11~~, wherein:

the digital input signal includes plural words, each of the words having an absolute value; and

the index calculating means calculates the index for each one of the sub blocks by determining a maximum of the absolute values of the words in the one of the sub blocks.

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20 ~~13~~. (amended) The apparatus of claim 18 ~~11~~, wherein:

(a) the index generating means includes:

(1) means for dividing the digital input signal [in time] into the sub blocks, and

(2) index calculating means for calculating an index for each of the sub blocks; and

(b) the block length decision means additionally includes block defining means, responsive to the comparing means, for determining a division of the digital input signal [in time] into blocks constituted [composed] of a selected one of:

(i) one of the sub blocks,

(ii) two consecutive ones of the sub blocks, and

(iii) four consecutive ones of the sub blocks.

D1 CONT

21 ~~14~~. (amended) The apparatus of claim 20 ~~13~~, wherein:

the means for dividing the digital input signal [in time] into the sub blocks includes:

means for dividing the digital input signal [in time] into frames, and

means for dividing each of the frames into a first sub block and a second sub block;

the comparing means is for comparing the indices of the first sub block and the second sub block to provide a comparison result; and

the block defining means determines a division of [each frame of] the digital input signal into blocks in which the frames of the digital input signal for which the comparison result indicates that [into two equal blocks when] the index of the second sub block is twenty or more times the index of the first sub block are divided into two equal blocks, and otherwise determines a division of the [frame of the] digital input signal into blocks in which the frames are each divided into a single block.

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22 ~~15~~. (amended) The apparatus of claim 20 ~~13~~, wherein:

(a) the means for dividing the digital input signal [in time] into sub blocks includes:

(1) means for dividing the digital input signal [in time] into frames, and

(2) means for dividing each of the frames into a first half sub block, a second half sub block, and into four quarter sub blocks, the four quarter sub blocks including pairs of consecutive ones of the quarter sub blocks, each of the pairs consisting of a first quarter sub block and a second quarter sub block;

(b) the comparing means is for comparing the indices of the first half sub block and the second half sub block to provide a first comparison result, and for comparing the indices of pairs of the first quarter sub block and the second quarter sub block in each of the pairs of consecutive ones of the [adjacent] quarter sub blocks to provide a second comparison result[, each pair of adjacent quarter sub blocks including a first quarter sub block and a second quarter sub block]; and

D1 cont

(c) the block defining means determines a division of [each frame of] the digital input signal into blocks in which:

(1) ones of the frames for which the second comparison result indicates that [into four equal blocks when] the index of the second quarter sub block of any one of the pairs of consecutive ones of the [adjacent] quarter sub blocks is twenty or more times greater than the index of the first of the one of the [any] pairs of the consecutive ones of the [adjacent] quarter sub blocks are divided into four equal blocks,

(2) ones of the frames for which the first comparison result indicates that [into two equal blocks when] the index of the second half sub block is ten or more times, but less than twenty times, the index of the first half sub block is divided into two equal blocks, and

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(3) ones of the frames for which the first comparison result indicates that [into a single block when] the index of the second half sub block is less than ten times the index of the first half sub block are divided into a single block.

~~16~~ 23. The apparatus of claim ~~8~~ 15, wherein the adaptive bit allocation means is for dividing the spectral coefficients into bands corresponding to critical bands.

~~17~~ 24. The apparatus of claim ~~8~~ 15, wherein the adaptive bit allocation means is for dividing the spectral coefficients towards higher frequencies into bands corresponding to a fraction of a critical band.

Sub E1

D1 cont

~~18. (amended) An apparatus for compressing a digital input signal,~~ the apparatus comprising:

means for deriving plural spectral coefficients from the digital input signal; and

adaptive bit allocation means for dividing the spectral coefficients by frequency into bands and for adaptively allocating a number of quantizing bits for quantizing the spectral coefficients in each of the bands in response to an allowable [allowed] noise level for each of the bands, the adaptive bit allocation means comprising:

allowable noise level calculation means for calculating an allowable [allowed] noise level for each of the bands.[;]

comparing means for comparing, in each of the bands, the allowable noise level with a minimum audible level.[;] and

selecting means for selecting the minimum audible level as the allowable noise level in [for] each of the bands for which [wherein] the comparing means determines that the minimum audible level is ~~higher than the allowable noise level~~.

~~19. The apparatus of claim 18, wherein the means for deriving plural~~ spectral coefficients from the digital input signal includes an orthogonal ~~transform circuit.~~

27 26
~~20~~. The apparatus of claim ~~19~~, wherein the orthogonal transform circuit is a Discrete Cosine Transform (DCT) circuit.

Sub E2

~~21. (amended) The apparatus of claims 18 or 19, wherein:~~

the number of quantizing bits adaptively allocated by the adaptive bit allocation means is [quantizes the spectral coefficients using] an actual number of bits;

the apparatus additionally includes:

means for providing an output signal including a target number of bits, and

means for determining an error between the actual number of bits and the target number of bits; and

D1 Cont

the allowable noise level calculation means includes means for adjusting the allowable noise level in response to the error between the actual number of bits and the target number of bits.

22. (amended) The apparatus of claim 21, wherein the adaptive bit allocation means [includes] adjusts the number of quantizing bits allocated to the bands in response to changes in the allowable noise level caused by the ~~means for adjusting the allowable [allowed] noise level.~~

23. (amended) The apparatus of claims 18 or 19, wherein the means for deriving spectral coefficients from the digital input signal includes:

block length decision means for determining a division of the digital input signal [in time] into blocks in response to an index;

block floating means for applying block floating processing to each block of the digital input signal using the index as a block floating coefficient; and

means for deriving the spectral coefficients from the block floating processed blocks of the digital input signal.

D1 Sub q3 Concl

24. ~~(amended)~~ The apparatus of ~~claims 18 or 19, wherein~~:

the bands whereinto the adaptive bit allocation means divides the spectral coefficients include a band corresponding to a critical band;

the adaptive bit allocation means is additionally for dividing the spectral coefficients [components] in the [a] band corresponding to a critical band into plural sub bands, the plural sub bands including a lowest-frequency sub band;

the comparing means is for comparing, in the band corresponding to a critical band, the allowable noise level for the band corresponding to a critical band with the minimum audible level for the lowest-frequency sub band; and

the selecting means is for selecting, as the allowable noise level for the band corresponding to a [the] critical band, the minimum audible level for [of] the lowest-frequency sub band when the comparing means indicates that the minimum audible level for [of] the lowest-frequency sub band is ~~higher than the allowable noise level~~.

1. (twice amended) An apparatus for compressing a digital input signal, the apparatus comprising:

[a] band division filter means for dividing the digital input signal in frequency into plural [a frequency range] signals, [in] each of the plural signals being in a respective one of plural frequency ranges, the plural signals including a frequency range signal in one of the plural frequency ranges;

[a] block length decision means, operating in response to an index, [circuit] for determining a division of the [each] frequency range signal [in time] into blocks to provide a block length decision signal indicating a block length for each of the blocks[in response to an index];

[a] block floating processing means, operating in response to the block length decision signal from the block length decision means and in response to the index, for applying block floating processing to the blocks of the [each] frequency range signal, each of the blocks having the block length indicated by the block length decision signal, the block floating processing circuit providing a block of a block floating processed frequency range signal from each of the blocks of the frequency range signal[in response to the index];

orthogonal transform means for orthogonally transforming the block of the [each] block floating processed frequency range signal to produce plural spectral coefficients[, the orthogonal transform means transforming each frequency range signal in blocks determined by the block length decision means]; and

adaptive bit allocation means for dividing the plural spectral coefficients from the orthogonal transform means into bands and for adaptively allocating a number of quantizing bits to quantize the spectral coefficients in each of the bands in response to an allowable noise level in each of the bands.

2. (twice amended) The apparatus of claim 1, wherein:

D2 cont'd

the [each] frequency range signal includes plural words, each of the words having an absolute value; and

the apparatus additionally includes [an] generating means for generating the index by calculating a logical sum of the absolute values of the words.

3. ~~25~~. The apparatus of claims 1 or 2, wherein the orthogonal transform means includes a Discrete Cosine Transform circuit.

4. ~~26~~. (amended) The apparatus of claim 1, wherein:

(a) the apparatus additionally comprises:

means for subdividing the frequency range signal into sub blocks, and

[an] index generating means for generating an index for each of the [plural] sub blocks obtained by subdividing the frequency range signal[in time];

D3 cont'd

(b) the block length decision means determines the [a] division of the [each] frequency range signal [in time] into blocks by comparing the indices of consecutive ones of the [adjacent] sub blocks of the [respective] frequency range signal to determine a number of the consecutive ones of the sub blocks to constitute each of the blocks; and

(c) the block floating processing means applies block floating processing to the [each] blocks of the [each] frequency range signal having the block length indicated [determined] by the block length decision signal [means] using, for each one of the blocks, a block floating coefficient calculated from the indices of the sub blocks constituting the one of the blocks.

5 ~~27~~. (amended) The apparatus of claim 4 ~~26~~, wherein:

the [each] frequency range signal includes plural words, each of the words having an absolute value; and

the index calculating means calculates the index for each one of the sub blocks by determining a maximum absolute value for the one of the sub blocks.

6 ~~28~~. (amended) The apparatus of claim 4 ~~26~~, wherein[:

D3 cont

(a) the index generating means includes :

(1) means for dividing each frequency range signal in time into sub blocks, and

(2) an index calculating means for calculating the index for each sub block;

(b)] the block length decision means includes:

(1) a comparing means for comparing the indices of the consecutive ones of the [adjacent] sub blocks to provide a comparison result, and

(2) a block defining means, responsive to the comparison result provided by the comparing means, for determining a division of the [each] frequency range signal into blocks constituted [composed] of a selected one of:

(i) one of the adjacent sub blocks;[,]

(ii) two of the adjacent sub blocks; [,] and

(iii) four of the adjacent sub blocks.

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~~29~~ 7. (amended) The apparatus of claim ~~28~~ 6, wherein:

the means for subdividing the [each] frequency range signal [in time] into sub blocks is additionally for subdividing the [each] frequency range signal into frames, the frames including a frame constituted of [and for dividing each frame into] a first sub block and a second sub block;

D3 Cont

the comparing means is for comparing the indices of the first sub block and the second sub block to provide the comparison result; and

the block defining means determines a division of the [each frame of each] frequency range signal wherein the frame of the frequency range signal constituted of the first sub block and the second sub block is divided into two equal blocks when the comparison result provided by the comparing means indicates that the index of the second sub block is twenty or more times the index of the first sub block, and otherwise determines a division of the frequency range signal wherein [of] the frame is divided into a single block.

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4 ~~30~~. (amended) The apparatus of claim 6 ~~28~~, wherein:

the means for subdividing the [each] frequency range signal [in time] into sub blocks subdivides the frequency range signal into half sub blocks and into quarter sub blocks, and is additionally for subdividing the [each] frequency range signal into frames, the frames including a frame constituted of [and for dividing each frame into] a first half sub block[,] and a second half sub block, the frame is also constituted of [and] four quarter sub blocks, the four quarter sub blocks including pairs of consecutive ones of the quarter sub blocks, each of the pairs consisting of a first quarter sub block and a second quarter sub block;

the comparing means is for comparing the indices of the first half sub block and the second half sub block to provide a first comparison result, and is additionally for comparing the indices of the first quarter sub block and the second quarter sub block in each of the pairs of [adjacent] consecutive ones of the quarter sub blocks to provide a second comparison result[, each pair of adjacent quarter sub blocks including a first quarter sub blocks and a second quarter sub block]; and

the block defining means determines a [is for determining a] division of the [each frame of each] frequency range signal wherein the frame of the frequency range signal is divided into :

> [into] four equal blocks when the second comparison result from the comparing means indicates that the index of the second quarter sub block of any one of the pairs of the consecutive ones of the [adjacent] quarter sub blocks is twenty or more times greater than the index of the first quarter sub block of the one of the [any] pairs of the consecutive ones of the [adjacent] quarter sub blocks,
>
> [into] two equal blocks when the first comparison result from the comparing means indicates that the index of the second half sub block is ten or more times, but less than twenty times, the index of the first half sub block, and

D3 ✓

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D3 cont'd

[into] a single block when the first comparison result from the comparing means indicates that the index of the second half sub block less than ten times the index of the first half sub block.

---

4 ~~3~~. (twice amended) An apparatus for compressing a digital input signal, the apparatus comprising:

band division filter means for dividing the digital input signal into plural [a frequency range] signals, [in] each of the plural signals being in a respective one of plural frequency ranges, the plural signals including a frequency range signal in one of the plural frequency ranges;

block floating processing means for applying block floating processing to blocks of the [each] frequency range signal to provide a block floating processed frequency range signal[divided in time into blocks];

D4 CONT

orthogonal transform means for orthogonally transforming [each] blocks of the block floating processed [each] frequency range signal to provide plural spectral coefficients; and

adaptive bit allocation means for dividing the spectral coefficients from the orthogonal transform means into bands and for adaptively allocating a number of quantizing bits for quantizing the spectral coefficients in each of the bands in response to an allowable noise level in each of the bands, the adaptive bit allocation means including:

allowable noise level calculation means for calculating the allowable noise level for each of the bands,

comparison means for comparing, in each of the bands, the allowable noise level with a minimum audible level and, [for setting a flag] for each of the [critical] bands in which [wherein] the minimum audible level is higher than the allowable noise level, for setting a flag, and

means for selecting, in each of the bands in which [wherein] the flag is set, the minimum audible level as the allowable [allowed] noise level.

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10 ~~4~~. (amended) The apparatus of claim 9 ~~3~~, wherein:

the adaptive bit allocation means quantizes the spectral coefficients using an actual number of quantizing bits;

the apparatus additionally includes:

means for providing an output signal including a target number of bits, and

means for determining an error between the actual number of bits and the target number of bits; and

D4 cont'd

the allowable noise level calculation means calculates the allowable [allowed] noise level from an energy in each of the bands, and includes means for adjusting the allowable noise level in response to the error between the actual number of bits and the target number of bits.

11 ~~5~~. (amended) The apparatus of claim 10 ~~4~~, wherein the adaptive bit allocation means additionally includes means for adjusting the number of quantizing bits allocated to each of the bands by changing the allowable noise level.

14 ~~31~~. (amended) The apparatus of claim 9 ~~3~~, wherein:

D5

the adaptive bit allocation means is additionally for dividing the spectral coefficients [components] in one of the [critical] bands from the orthogonal transform means into plural sub bands, the plural sub bands including a lowest-frequency sub band; and

the comparison means is for comparing, in the one of the [critical] bands, the allowable noise level for the one of the [critical] bands with the minimum audible level for the lowest-frequency sub band, and for setting the flag for the one of the [critical] bands when the minimum audible level for [of] the lowest-frequency sub band is higher than the allowable noise level.

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18 ~~6~~. (twice amended) The apparatus of claim 9 ~~3~~, wherein:

the apparatus additionally comprises a block length decision means, operating in response to an index, for determining a division of the [each] frequency range signal [in time] into the blocks[in response to an index];

the block floating processing means applies block floating processing to the [each] blocks of the [each] frequency range signal using the index as a block floating coefficient; and

D6

the orthogonal transform means transforms the [each] block floating processed frequency range signal divided into [in] blocks determined by the block length decision means.

13 ~~7~~. (amended) The apparatus of claims 9, 10, 11 ~~3, 4, 5,~~ or 18 ~~6~~, wherein the orthogonal transform means includes a Discrete Cosine Transform (DCT) circuit.

31 ~~32~~. (amended) A method for compressing a digital input signal, the method comprising the steps of:

generating an index in response to the digital input signal;

determining a division of the digital input signal into blocks in response to the index;

applying block floating processing to the blocks of the digital input signal in response to the index to provide block floating processed blocks of the digital input signal;

D7 cont

orthogonally transforming each of the block floating processed blocks of the digital input signal to produce plural spectral coefficients; and

dividing the plural spectral coefficients into bands, and adaptively allocating a number [numbers] of quantizing bits to quantize the spectral coefficients in each of the bands.

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32 ~~33~~. The method of claim 31 ~~32~~, wherein:

the digital input signal comprises plural words, each of the plural words having an absolute value; and

in the step of generating an index, the index is generated by calculating a logical sum of the absolute values of the words.

33 ~~34~~. (amended) The method of claims 31 ~~32~~ or 32 ~~33~~, wherein, in the step of orthogonally transforming each of the block floating processed blocks of the digital input signal, each of the block floating processed blocks of the digital input signal is orthogonally transformed using a discrete cosine transform.

D7 cont

34 ~~35~~. (amended) The method of claim 31 ~~32~~, wherein:

(a) in the step of generating an index, an index is generated for each of plural sub blocks obtained by dividing the digital input signal[in time];

(b) the step of determining a division of the digital input signal into blocks includes a [the] step of comparing the indices of consecutive [adjacent] sub blocks of the digital input signal to determine a number of the consecutive sub blocks of the digital input signal to constitute each one of the blocks; and

(c) in the step of applying block floating processing to the blocks [each block] of the digital input signal, block floating processing is applied to the blocks [each block] of the digital input signal using, for each one of the blocks, a block floating coefficient calculated from the indices of the sub blocks constituting the one of the blocks.

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35 ~~36~~. (amended) The method of claim 34 ~~35~~, wherein:

the digital input signal includes plural words, each word having an absolute value; and

in the step of generating [calculating] an index, the index for each one of the sub blocks is calculated by determining a maximum of the absolute values of the words in the one of the sub blocks.

D1 CONT

36 ~~37~~. (amended) The method of claim 34 ~~35~~, wherein:

(a) the step of generating [calculating] an index includes [the] steps of:

(1) dividing the digital input signal [in time] into sub blocks, and

(2) calculating an index for each of the sub blocks; and

(b) in the step of determining a division of the digital input signal into blocks, a division of the digital input signal [in time] into blocks constituted [composed] of a selected one of one sub block, two sub blocks, and four sub blocks is determined in response to the step of comparing the indices of consecutive [adjacent] sub blocks.

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37 ~~38~~. (amended) The method of claim 36 ~~37~~, wherein:

(a) the step of dividing the digital input signal [in time] into sub blocks includes [the] steps of:

(1) dividing the digital input signal [in time] into frames, and

(2) dividing each frame into a first sub block and a second sub block;

D7 cont

(b) in the step of the comparing the indices of <u>consecutive</u> [adjacent] sub blocks, the indices of the first sub block and the second sub block are compared; and

(c) in the step of determining a division of the digital input signal into blocks, a division of each frame of the digital input signal into two equal blocks is determined when the step of comparing determines that the index of the second sub block is twenty or more times the index of the first sub block, and a division of the frame of the digital input signal into a single block is otherwise determined.

38 ~~39~~. (amended) The method of claim 36 ~~37~~, wherein:

(a) the step of dividing the digital input signal [in time] into sub blocks includes [the] steps of:

(1) dividing the digital input signal [in time] into frames, and

(2) dividing each frame into a first half sub block, a second half sub block, and into four quarter sub blocks;

(b) in the step of comparing the indices of consecutive [adjacent] sub blocks, the indices of the first half sub block and the second half sub block are compared, and the indices of pairs of consecutive [adjacent] quarter sub blocks are compared, each pair of consecutive [adjacent] quarter sub blocks including a first quarter sub block and a second quarter sub block; and

D1 cont

(c) in the step of determining a division of the digital input signal [in time] into blocks, the division of each frame of the digital input signal is determined as follows:

(1) into four equal blocks when the step of comparing indicates that the index of the second of any pair of consecutive [adjacent] quarter sub blocks is twenty or more times greater than the index of the first of any pair of consecutive [adjacent] quarter sub blocks,

(2) into two equal blocks when the step of comparing indicates that the index of the second half sub block is ten or more times, but less than twenty times, the index of the first half sub block, and

(3) into a single block when the step of comparing indicates that the index of the second half sub block less than ten times the index of the first half sub block.

39 ~~40~~. The method of claim 31 ~~32~~, wherein, in the step of dividing the plural spectral coefficients into bands, the spectral coefficients are divided into bands corresponding to critical bands.

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40 ~~41~~. The method of claim 31 ~~32~~, wherein, in the step of dividing the plural spectral coefficients into bands, the spectral coefficients towards higher frequencies are divided into bands corresponding to a fraction of a critical band.

41 ~~42~~. (amended) The method of claim 31 ~~32~~, wherein:

the method additionally comprises a [the] step of dividing the digital input signal into plural signals, each of the plural signals being in a respective one of plural frequency ranges, the plural signals including a frequency range signal in one of the [each of] plural frequency ranges;

D7 cont

in the step of generating an index in response to the digital input signal, an index is generated in response to the [each] frequency range signal;

in the step of determining a division of the digital input signal into blocks, the division of the [each] frequency range signal into blocks is determined in response to the [respective] index;

in the step of applying block floating processing to the digital input signal, block floating processing is applied to the blocks of the [each] frequency range signal in response to the [respective] index to provide block floating processed blocks of the frequency range signal; and

in the step of orthogonally transforming each of the block floating processed blocks of the digital input signal, each of the block floating processed blocks of the [each] frequency range signal is orthogonally transformed to produce ones of the plural spectral coefficients.

Sub E5

~~43. (amended) A method for compressing a digital input signal, the~~ method comprising the steps of:

deriving plural spectral coefficients from the digital input signal;

dividing the spectral coefficients by frequency into bands; and

adaptively allocating a number of quantizing bits for quantizing the spectral coefficients in each of the bands in response to an allowable [allowed] noise level for each of the bands, the step of adaptively allocating a number of quantizing bits comprising [the] steps of:

calculating an allowable noise level for each of the bands,

comparing, in each of the bands, the allowable noise level with a minimum audible level, and

selecting the minimum audible level as the allowable noise level in [for] each of the bands for which [wherein] the step of comparing determines that the minimum audible level is higher than the allowable noise level.

D7 Cont

44. (amended) The method of claim 43, wherein the step of deriving plural spectral coefficients from the digital input signal includes a [the] step ~~of orthogonally transforming the digital input signal.~~

44 ~~45~~. The method of claim 43 ~~44,~~ wherein, in the step of orthogonally transforming the digital input signal, the digital input signal is orthogonally transformed using a discrete cosine transform.

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Delete

~~46. (amended) The method of claims 43 or 44~~, wherein the method is for compressing the digital input signal to provide [provides] a compressed signal including a target number of bits, and wherein:

in the step of adaptively allocating a number of quantizing bits, the number of bits adaptively allocated is [the spectral coefficients are quantized using] an actual number of bits;

the method additionally includes the step of determining an error between the actual number of bits and the target number of bits; and

the step of adaptively allocating a number of quantizing bits includes the step of adjusting the allowable noise level in response to the error between the actual number of bits and the target number of bits.

D7 CONT

47. (amended) The method of claim 46, wherein, in the step of adaptively allocating a number of quantizing bits, the number of quantizing bits allocated to the bands is adjusted in response to changes in the allowable noise level caused by the step of adjusting the allowable [allowed] noise ~~level.~~

48. (amended) The method of claims 43 or 44, wherein the step of deriving spectral coefficients from the digital input signal includes [the] steps of:

determining a division of the digital input signal [in time] into blocks in response to an index;

applying block floating processing to each block of the digital input signal using the index as a block floating coefficient; and

deriving the spectral coefficients from the block floating processed blocks of the digital input signal.

Sub E7

49. (amended) ~~The method of claims 43 or 44, wherein:~~

in the step dividing the spectral coefficients into bands, the spectral components are divided into bands including a band corresponding to a critical band, and the spectral coefficients in the band corresponding to a critical band are divided into plural sub bands, the plural sub bands including a lowest-frequency sub band;

D7 cont

in the step of comparing the allowable noise level for the band corresponding to a critical band is compared with the minimum audible level for the lowest-frequency sub band; and

in the step of selecting, the minimum audible level for the lowest-frequency sub band is selected as the allowable noise level for the band corresponding to a [the] critical band when the step of comparing indicates that the minimum audible level for [of] the lowest-frequency sub band is ~~higher than the allowable noise level.~~

50 (amended) The method of claim 43, wherein the step of deriving plural spectral coefficients from the digital input signal comprises [the] steps of:

dividing the digital input signal into plural [a frequency range] signals, [in] each of the plural signals being in a respective one of plural frequency ranges, the plural signals including a frequency range signal in one of the plural frequency ranges;

D7 Cont

generating an index in response to the [each] frequency range signal;

determining a division of the [each] frequency range signal into blocks in response to the [respective] index;

applying block floating processing to the blocks of the [each] frequency range signal in response to the [respective] index to generate a block of a block floating processed frequency range signal from each of the blocks of the frequency range signal; and

orthogonally transforming the [each] block floating processed block of the [each] frequency range signal to produce ones of the plural spectral coefficients.

49 ~~51~~. (amended) An apparatus for expanding a compressed digital signal including plural quantized spectral coefficients and auxiliary information, the apparatus comprising:

adaptive bit allocation decoding means, operating in response to the auxiliary information, for inversely quantizing the quantized spectral coefficients to provide plural spectral coefficients;

D7 cont

block floating means for applying inverse block floating to the spectral coefficients to provide inverse block floating processed spectral coefficients;

inverse orthogonal transform means for inversely orthogonally transforming the inverse block floating processed spectral coefficients to provide plural frequency range signals; and

inverse filter means for synthesizing the frequency range signals to provide an output signal.

50 ~~52~~. The apparatus of claim 49 ~~51~~, wherein the inverse orthogonal transform means includes an inverse discrete cosine transform circuit.

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~~53~~ 51. (amended) The apparatus of claim ~~51~~ 49, wherein:

(a) the apparatus is for expanding a compressed digital signal wherein:

(1) the spectral coefficients are quantized in critical bands,

(2) the critical bands include a divided band, the divided band being a [at least one] higher-frequency one of the critical bands that is divided into plural sub bands, the sub bands including a lowest-frequency sub band, and

D7 CONT

(3) the auxiliary information includes an allowable noise level for each of the critical bands, the allowable noise level for the divided [critical] band [divided into sub bands] being the allowable noise level for the lowest-frequency sub band; and

(b) the apparatus additionally comprises means for determining an allowable noise level for each sub band of [in] the divided [critical] band in response to the allowable noise level for the divided [critical] band.

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57 ~~54~~. (amended) A method for expanding a compressed digital signal to provide a digital output signal, the compressed digital signal including:

(a) plural quantized spectral coefficients divided by frequency into bands, [at least one of] the bands including [being] a divided band in which [wherein] the spectral coefficients therein [in the band] are further divided by frequency into sub bands, the quantized spectral coefficients in each of the bands and each of the sub bands being quantized using an adaptively-allocated number of quantizing bits, [the compressed digital signal additionally including]

(b) an allowable [allowed] noise level for each band, and[,]

(c) a flag signal for the [each] divided band, [a flag signal, the quantized spectral coefficients in each band and sub band being quantized using an adaptively-allocated number of quantizing bits,]

D1 cont

the method comprising the steps of:

setting[, in each divided band,] the allowable [allowed] noise level of the divided band as the allowable [allowed] noise level for the divided band when the flag signal for the divided band is in a first state, and setting[, in each divided band,] the allowable [allowed] noise level of the divided band as the allowable [allowed] noise level for one of the sub bands constituting the divided band when the flag signal for the divided band is in a second state;

determining, [in each divided band] when the flag signal for the divided band is second state, from the allowable [allowed] noise level of the divided band, an allowable [allowed] noise level for each of the other ones of the sub bands constituting the divided band;

using the allowable noise level for each of the bands and for each of the sub bands constituting the divided band to inversely quantize the respective quantized spectral coefficients in each of the bands and in each of the sub bands constituting the divided band to provide spectral coefficients; and

deriving the digital output signal from the spectral coefficients.

51

53 ~~55~~. (amended) The method of claim 52 ~~54~~, wherein:

when the flag signal for the divided band is in the second state, the allowable [allowed] noise level for the [each] divided band is the allowable [allowed] noise level for the lowest-frequency one of the sub bands constituting [in] the divided band; and

in the step of determining an allowable [allowed] noise level for each of other ones of the sub bands constituting the divided band, the allowable [allowed] noise level for each of the other ones of the sub bands higher in frequency than the lowest-frequency one of the sub band is calculated.

54 ~~56~~. (amended) The method of claim 52 ~~54~~, wherein:

the method additionally includes a [the] step of providing a read-only memory wherein allowable noise levels are stored; and

the step of determining an allowable [allowed] noise level for each of other ones of the sub bands constituting the divided band includes a [the] step of reading an allowable [allowed] noise level for each of the other ones of the sub bands from the read-only memory in response to the allowable [allowed] noise level for the divided band.

D1 CONT'D

55 ~~57~~. (amended) The method of claim 52 ~~54~~, wherein the step of deriving the digital output signal from the spectral coefficients includes [the] steps of:

dividing the spectral coefficients by frequency into plural frequency ranges;

inversely orthogonally transforming the spectral coefficients in each of the frequency ranges to provide [a] frequency range signals; and

synthesizing the frequency range signals to provide the digital output signal.

56 ~~58~~. (amended) The method of claim 52 ~~54~~, wherein, in the compressed digital signal, the plural quantized spectral coefficients are divided by frequency into bands corresponding to critical bands.